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This unit and teacher's guide were prepared for use with primary grade children. The activities include the construction of a desert terrarium, the study of cacti, and the use of animal sort cards. A special section is devoted to the way parents can help with the unit. A detailed list of needed materials is provided in the guide. This work was prepared under ESEA Title III contract. (BC)

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desert life

Experimental Edition Prepared For Testing in the Primary Grades

DESERT LIFE

Developed by: **Betty Shelby,** *team leader*
Pat Barger
Claire Blinn
Eleanor Homeyer
Janet Hunt
Barbara Johnson
Judy Shannon
Barbara Spillman

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I INTRODUCTION

A desert terrarium allows you to have a miniature desert in your classroom. The children can learn a great deal about desert life by observing the behavior of the lizards and gerbils. Other activities that your children can do are to examine an assortment of small cacti, study animal tracks, and classify desert animals using picture cards.

As a second grade teacher in Wellesley, you will have the opportunity to keep a desert terrarium in your room this year. All of the necessary equipment and printed material is available from the Curriculum Center. You can have a terrarium for one half year, either from October to January, or from February to May.

Contained in this Teacher's Guide are some suggestions for teaching about desert life. We do not expect you to engage in all the activities or to do them necessarily in their present order. Listen to your students' comments and questions, and adjust your presentation to best meet their interests.

The preparation of Desert Life is by no means completed. We hope that when your experiences are added to ours, an improved version of the unit can be written. Please keep a record of what you do so you can make suggestions when the unit is re-evaluated.

Many people have assisted us in the development of Desert Life. The original idea for a unit on deserts came from work done by the Elementary Science Study of Education Development Center. Hannalou Coco and Delores Woods, two parents of children who studied desert life this year, helped us with ideas on ways to involve parents. Richard Woods took the photographs of the tumbleweeds for the filmstrip. We want to thank the staff of the CLMP Project for their numerous contributions: George Moore, Project Director; Leo LaMontagne, Project Supervisor, Beth LaFleur, Primary Grade Resource Teacher; David Webster, Curriculum Specialist; Irene Shwachman, staff photographer; Tom McGuire, staff artist; L. Dennis McLaughlin, off-set operator and office manager; Gerald Marchitelli, designer-cabinet maker, and Ruth Fay, Secretary of the Curriculum Center.

Betty Shelby, Team Leader
Perrin School

Barbara Spillman
Bates School

Barbara Johnson
Perrin School

Judy Shannon
Hunnewell School

Janet Hunt
Perrin School

Pat Barger
Hunnewell School

Eleanor Homeyer
Kingsbury School

Clair Blinn
Physical Education Dept.

II MATERIALS

Desert Terrarium

Terrarium

2 buckets of soil-sand mixture

3 flat rocks

2 chuckwalla lizards

2 desert iguana lizards

2 gerbils

5 pounds sunflower seed

100 mealworms

Cacti

25 small cacti

magnifying glass

1 set of Cacti Name Cards

1 set of Cacti Picture Cards

Tumbleweed

Filmstrip on Tumbleweed

Animal Sort Cards

2 sets of Animal Sort Cards

Tracks in the Desert

Set of Track Cards

Photographs of Desert Animals

2 Sort Card racks

Printed Materials

Desert Dwellers

Let's Go to the Desert

The Desert (Life)

Reptiles and Amphibians

Mammals (Golden)

Arizona Highways, January, 1966

Arizona Highways, January, 1967

6 Copies, The Curious Gerbil (ESS)

30 Copies, Cacti Extra from My Weekly Reader

30 Copies, Guide for Parents

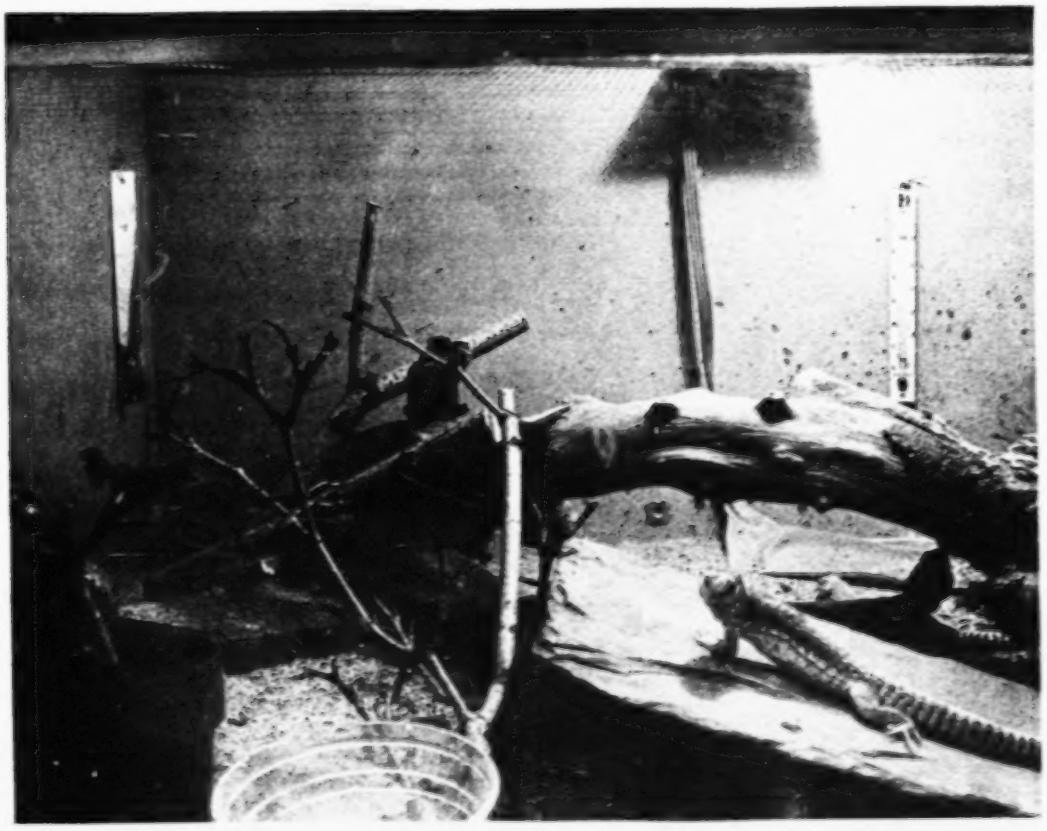
III PRINCIPAL ACTIVITIES

A. THE DESERT TERRARIUM

Setting up the Terrarium

When the Terrarium is delivered to your classroom, the bottom should be covered with a layer of moist soil and sand about three inches deep. If the soil becomes dry, the tunnels that the gerbils dig will collapse. To prevent this from happening, sprinkle water on top of the soil each day. The water also causes some of the sunflower seeds that are given as food to sprout.

You should arrange several rocks in the terrarium to make a little cave where the lizards can hide out of the heat. The lizards should also have some branches to climb on for exercise and for getting closer to the light bulb. Four or five of the small cacti can be planted in the terrarium to make it look more like a real desert.



Care of Lizards and Gerbils

Feeding. Provide a small handful of chopped lettuce in a small dish. The lettuce should be sprinkled with cold water and replaced with a fresh supply when it becomes wilted. All of the animals will probably eat some of the lettuce. Iguanas will also eat mealworms. Place the worms one at a time near the lizard's head until it eats no more. An average mealworm consumption is two to five per feeding. White and yellow flowers, such as clover blossoms, dandelions, and marigolds seem particularly appealing to chuckwallas. Gerbils are especially fond of sunflower seeds, which can be offered to them occasionally for a treat. Some of the other foods you could try are grated carrot and pieces of soft fruits. Additional information on the care of gerbils can be found in the ESS booklet, The Curious Gerbil.

Handling. All the desert animals can be handled without danger. There have been several instances when a child has been bitten by a gerbil or chuckwalla. This probably occurs when the animal mistakes the finger for food. A cut resulting from a bite should be treated as any other small abrasion.

Chuckwallas are slow moving and are able to cling to one's clothes. Children find it fun to walk around with one holding onto their shirt. The iguanas are quite quick, but they can be carried around in one's hand. They should not be picked up by the tail since it may break off.

Warmth. The temperature at ground level beneath the bulb should be between 85 to 95°F. Check this with the thermometer and contact the Curriculum Center if the cage is too hot or too cold.

It may seem strange that desert animals suffer from cool temperatures when one considers that the temperature of the desert floor becomes quite cool at night. In their natural habitat, however, the animals are much more active and have deep burrows for protection against the cold.

Animal escape. If the top of the terrarium is not secured, one of the animals may get out. A thorough search of the room by you and your students might uncover the hiding fugitive. The heat of a lamp close to the floor might attract an iguana; gerbils usually can be lured out with food.

Animal death. Even with the best of care, an animal will sometimes die. You might want to prepare your children for such an unfortunate event by talking about the possibility of an animal dying.

During vacation. Since desert animals require relatively little care, they can be left unattended during long school vacations. Just put in an extra amount of food before you leave.

Observing the Desert Animals

Your children can learn a great deal about the desert animals just by watching, handling, and taking care of them. Allow the students to take the animals out of the terrarium as much as possible during convenient times. The responsibility for feeding should be delegated to the children.

After the children have had several weeks to become acquainted with the new animals, you could spend some time talking about them. Point out how the animals are adapted for desert life. For example, see if anyone can guess why the chuckwalla has loose folds of skin on its neck and body. Perhaps someone will have seen the lizard inflate its body to wedge itself between the rocks in the terrarium. Such tactics make it difficult for an attacker to dislodge a chuckwalla from its hiding place. Read about the animals in the books on the desert so you can discuss other ideas with your class.

By asking appropriate questions, you can force the children to extend their observations. In one trial class the children noticed how the gerbils used a tin can to sleep in. The teacher asked how the class might experiment to find out if the gerbils preferred a particular kind of can. Some of the children brought in cans of different sizes and materials. The gerbils moved the cans around, filled a large can with paper, and put a small can inside of another large can. A juice can made of cardboard was chewed up. Many other experiments are suggested in The Curious Gerbil, which the children could read by themselves.

B. CACTI

The twenty-five cacti provided for Desert Life have been selected to illustrate the diverse appearance of these interesting kinds of plants. Most children are anxious to learn the names of the unidentified plants, and you can use this interest as a motivation for them to observe the cacti's structure.

The Cacti Name Cards give the name of each cactus. As an initial activity, a small group of children can attempt to match each name with the correct plant. In many instances the name is descriptive enough to allow rather easy identification. With a little imagination it is easy to find the pincushion or the bishop's cap. A few of the cacti have only scientific names.

A second set of cards, the Cacti Picture Cards, have photographs to make the task of identification easier. When the students have done as much as they can with the Name Cards, you can give them the Picture Cards. Using these they should be able to identify most of the plants.

Ask the children to compare cacti with the plants that grow in Wellesley. Besides the obvious structural differences, they should notice variation in growth rates, flowers, and water requirements. Pull up a cactus and cut it in half so the children can see its roots and insides. Let them use the magnifying glass to examine the cacti's needles.

You could pass out the Supplements from the Weekly Reader so the children could read about cacti. In the two issues of Arizona Highways supplied, there are beautiful color photographs of cacti flowers.

While not a cacti, the tumbleweed is a common desert plant. The Tumbleweed Filmstip shows various stages in its growth. The pieces of tumbleweed provided illustrate the brittleness of the mature plant; pieces break off as it rolls along the desert, thereby scattering its seeds over a wide area.

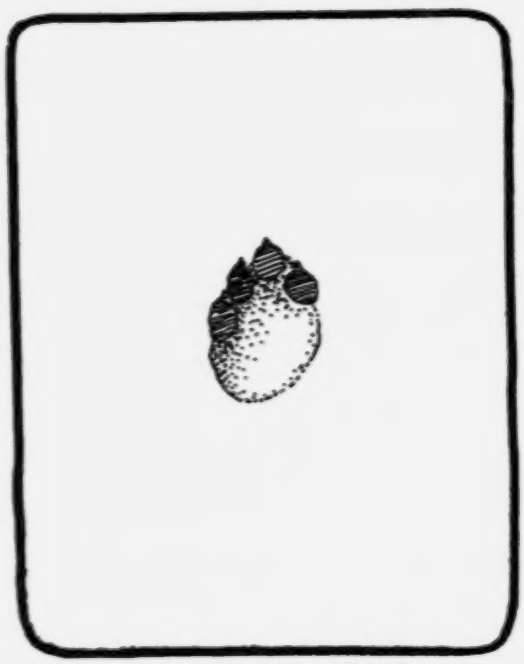
Here are the names of the cacti you will receive.

Belle of Argentina
Bird's Nest Cactus
Bishop's Cap
Blue Torch Cactus
Copper Leaf Plant
Cotton Ball
Donkey's Tail
Electrode Cactus
Giant Saguro
Golf Ball
Hedgehog Cactus
Indian Comb Cactus
Lemaireocereus
Miniature Fishhook Cactus
Ornamental Bishop's Cap
Paper Spine Cactus
Pearl Echeveria Cactus
Pincushion Cactus
Powder Puff Cactus
Prickly Pear
Sea Urchin Cactus
Silver Cluster Cactus
Tiger Jaws Cactus
The Small Potato Plant
Trichocerous Pasacana

C. TRACKS IN THE DESERT

Identification of the Track Cards

The Track Cards illustrate the footprints of four animals: jack rabbit, mule deer, spotted skunk, and coyote. There are 160 cards in a classroom set, which includes 10 prints for each foot of the four animals. All the prints are actual size.



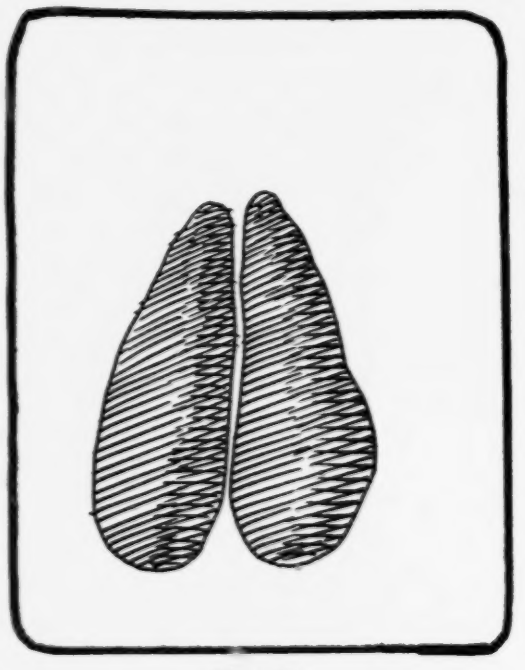
Rabbit Forefoot

Skunk Forefoot

Coyote

Rabbit Hind Foot

Skunk Hind Foot



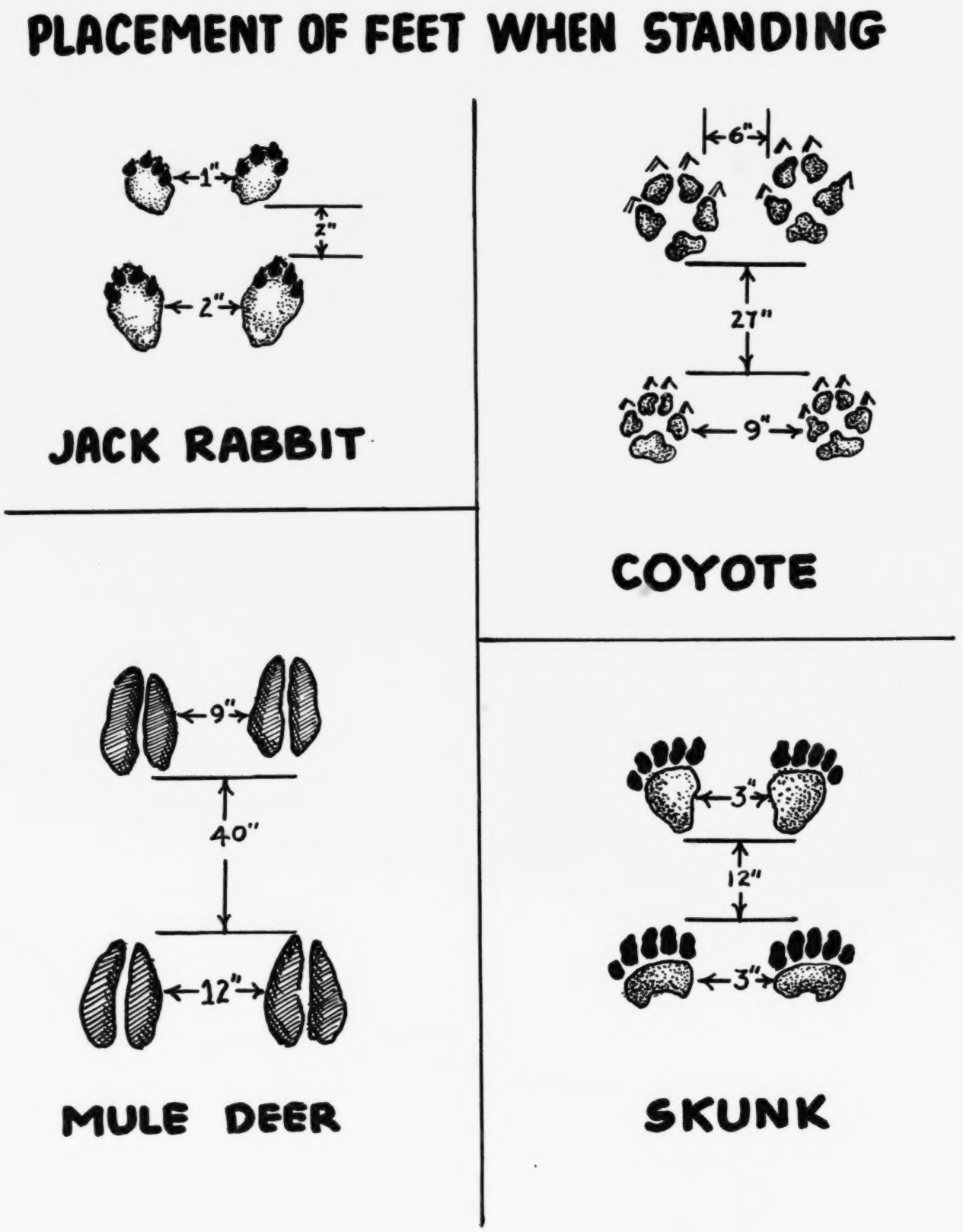
Deer

At first, the children will probably be most interested in identifying the tracks. The collection of desert animal photographs should help them to do this. Display the photos on a sort card rack and give each child one print of each animal. Can they now match their print cards with the proper animals? The photos are identified for you below. In some cases a photograph may reveal some information about the structure of the animal's foot. Perhaps some students are familiar with the feet of their pet dog or rabbit, and can relate this to the coyote or jack rabbit. Size is also an important factor. The coyote track, for example, is much too large to be made by a mouse.

Number			
1	Coyote	10	Pack rat
2	Spotted skunk	11	Kit fox
3	Jack rabbit	12	Road runner
4	Mule deer	13	Armadillo
5	Badger	14	Snake
6	Peccary	15	Desert tortoise
7	Pronghorn antelope	16	Horned toad
8	Kangaroo rat	17	Gila monster
9	Ground squirrel		

2. Placement of Feet when Standing

The children can next be asked to arrange four tracks of an animal in a standing position. If the class is divided into four groups, each group can work with the tracks of a single animal. The cards can be laid out on the floor or held in a sort card rack.



In doing this activity, the children are forced to distinguish between the fore feet and hind feet. Let the children do what they can before offering them any assistance. Rabbits and skunks have larger hind feet than fore feet. A skunk's tracks are misleading, however, since it does not walk on the soles of its hind feet. The coyote's front feet are a little larger than its hind feet, while all four feet of the mule deer are practically the same size and shape. Except for the deer, the right feet of the animals are different from the left ones. Call the children's attention to the arrangement of their own fingers and toes. The space between the tracks, of course, is determined by the size of the animal.

Footprint patterns when Walking and Running

It is quite difficult for children, and even for adults to figure out how a four-legged animal places its feet when walking. There are a variety of activities that might help the children learn walking patterns. It is not essential for you to do all of these, or to use them in any particular order. For your information, the tracks made by the four animals when walking are sketched on pages 16 and 17.

a. Watching animals walk. When a cat or dog is spotted outside the school, have your students notice how it moves its legs. A pet rabbit or guinea pig can be brought from home and watched as it moves about the classroom.

b. Moving like animals in the gym. In gym classes, the children can try to imitate certain desert animals by hopping, walking, jumping or running.

c. Observation of footprints. When there are suitable mud or snow conditions, take the class for a walk so they can examine and sketch footprint patterns.

d. Arranging Track Cards. The children can attempt to lay out the track cards in proper order on the floor of the classroom or gym.

e. Film loop on Animal Motion. The film loop Escape in Mammals contains the following slow motion sequences:

Coyote: displaying techniques of rolling under adversary, regaining feet, and escaping in new direction.

North American Otter: Sliding on snow, running at speed.

Black-tailed jackrabbit: In full flight at (perhaps) 35 mph and covering 10 yards at a bound.

Pronghorn antelope: Bounding on all four feet and cantering.

This loop is available from the Wellesley Audio-Visual Center.

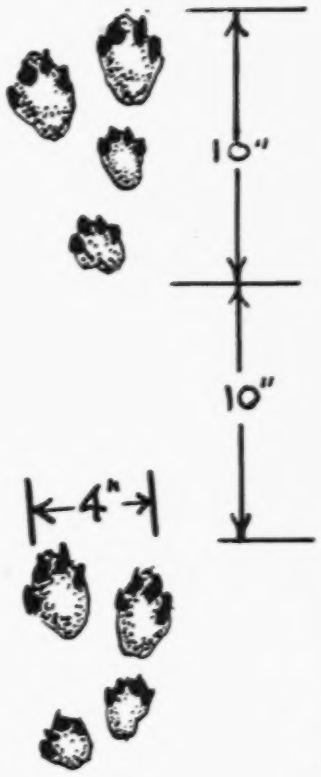
Gerbil tracks made by Gerbil after walking through paste ink rolled out on glass

Part of a series of pictures made by a child to illustrate the Iguana's method of walking

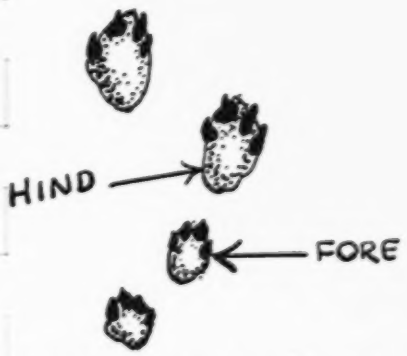
TRACK PATTERNS

JACK RABBIT

SLOW SPEED HOP



DIRECTION OF TRAVEL

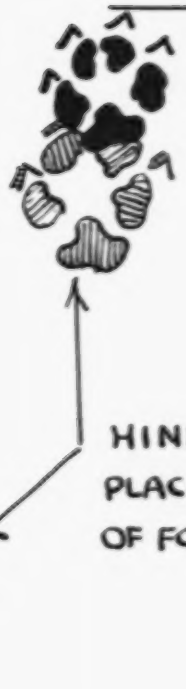


NOTE VARIATION IN PLACEMENT.

COYOTE

WALK

ABOUT 14"



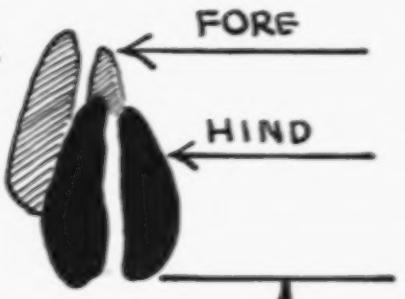
HIND PRINT PLACED ON TOP OF FORE PRINT.

DIRECTION OF TRAVEL

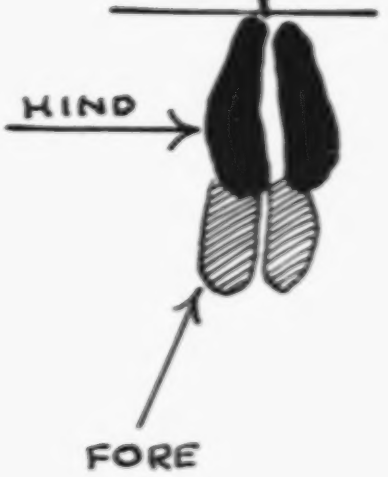
HIND PRINT SLIGHTLY SMALLER THAN FORE PRINT.

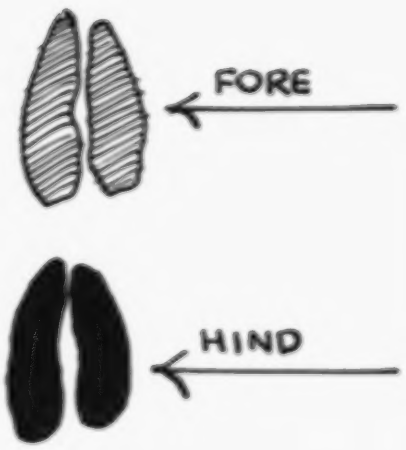
MULE DEER

WALK

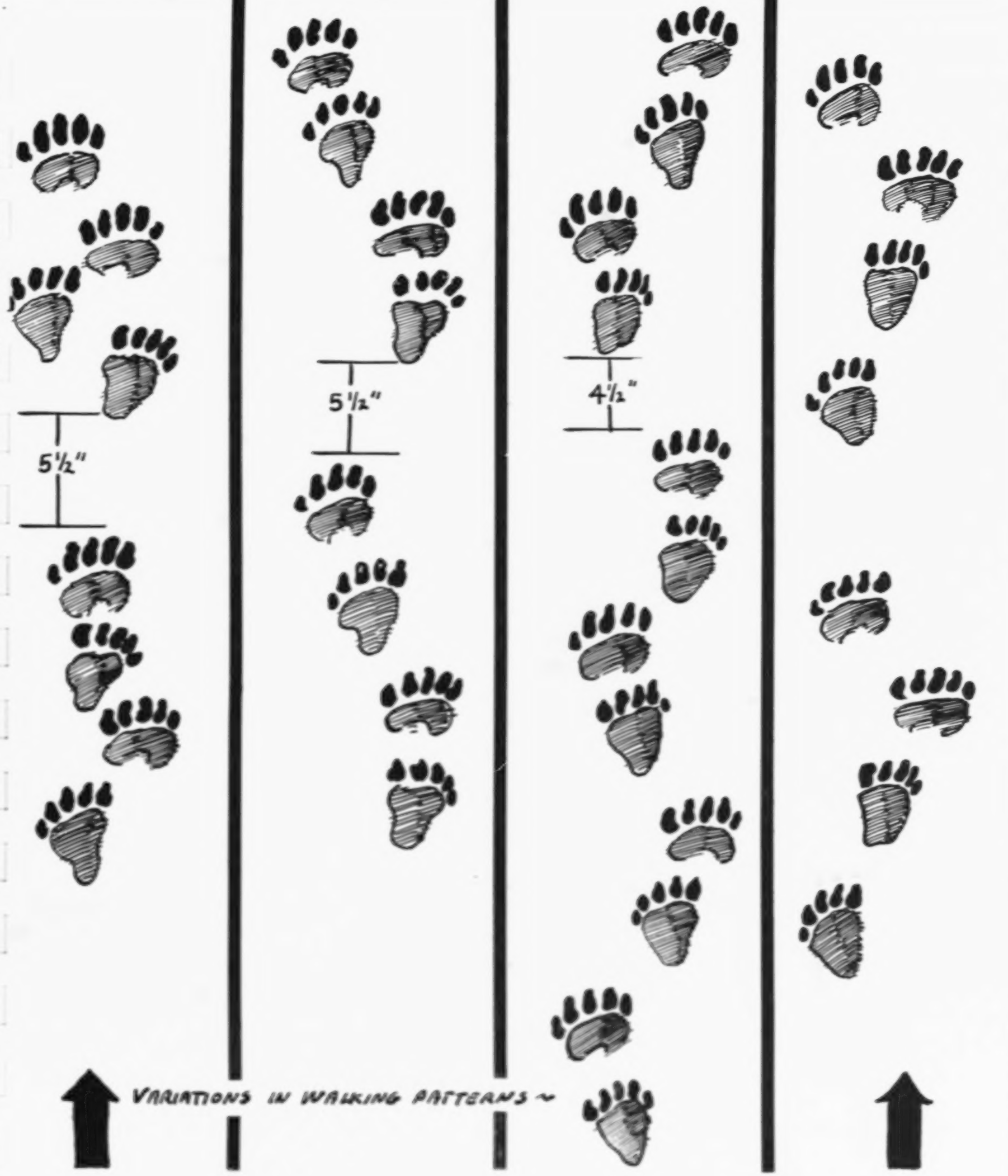


22" ~ 24"





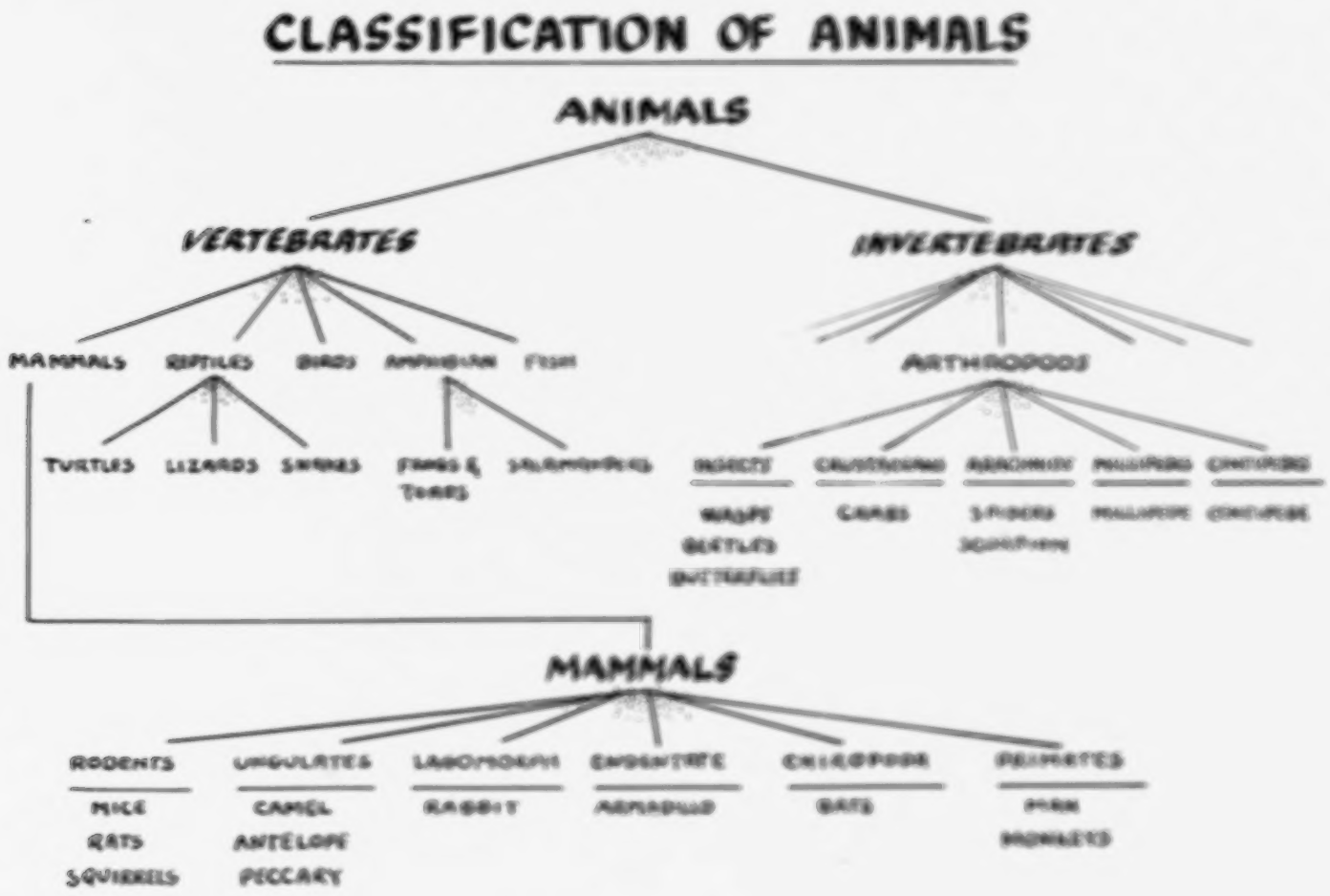
SKUNK



D. ANIMAL SORT CARDS

The sort cards contain pictures of many animals that inhabit the deserts of the Southwest. On the following page is a list that identifies the animals for you. The sort card rack is designed to hold the cards so a large number can be viewed and arranged at the same time.

Ask the children to arrange the cards into similar groups. The accepted way for doing this is to divide the animals into mammals, birds, reptiles, amphibians, and insects. (See animal classification chart below). Children, however, often classify according to other criteria. You should accept almost any system as long as the originators can explain what criteria they have used.



When the animals have been divided into main groups, you could see if the students can subdivide each large group.. For example, hawks might be distinguished from other birds by their forward-looking eyes, talons, and sharp curved beaks. Birds like the quail and road runner might be put into another subgroup. These birds do not fly well, and have protective coloration and feet suited for scratching.

You might want to spend some time talking with the class about some of the animals. You could ask where an animal lives, what food it might eat, and how it protects itself. Point out some of the ways that the animals are adapted for living in dry sandy regions. The spade foot toad, as its name implies, has feet shaped to facilitate digging a burrow. The fringes on the toes of a fringe-toed lizard help it to walk on top of dry sand. Encourage the children to find out more about the animals in books.

IDENTIFICATION OF SORT CARD PICTURES

page numbers refer to Reptiles and Amphibians (Golden Book) and Mammals (Golden Book)

Mammals

1 big brown bat p. 26

2 big eared bat p. 27

9 ring tail cat & coatis p. 37

10 spotted skunk p. 49

12 American badger with burrow p. 51

15 kit fox p. 53

16 gray fox with den p. 55

18 coyote p. 56

23 antelope ground squirrel p. 73

24 Apache pocket mouse p. 90

26 desert kangaroo rat p. 93

28 desert woodrat p. 100

29 black-tailed jack rabbit and antelope jack rabbit p. 121

32 peccary p. 129

37 pronghorn antelope p.141

41 armadillo p. 142

42 camels

44 children

(List continued on next page)

Birds

6 red-tailed hawk

7 bald eagle

13 red shouldered hawk

20 rough-legged hawk

27 owl attacking snake

33 falcon with pheasant

34 barred owl

Arthropods

8 pepsis wasp

14 tarantula

19 centipede

30 long horn beetle

31 black widow spider

39 scorpion

Reptiles

3 Western box turtle p. 39

5 chuckwalla p. 49

11 collared lizard p. 52

17 leopard lizard p. 53

21 fringe-footed lizard p. 55

22 horned lizard p. 58

25 Texas horned lizard p. 59

35 gila monster p. 69

36 hog-nosed snake p. 81

38 patch nosed snake p. 88

40 leaf nosed snake p. 89

43 bull snake p. 97

45 Western diamond back p. 113

Amphibian

4 spade foot toad p. 121

E. ART AND LANGUAGE ACTIVITIES

Some suggestions on art activities:

1. Draw pictures of the desert animals in the terrarium.
2. Make models of the animals from paper or clay.
3. Draw large murals showing day and night on the desert.

Some suggestions on reading and writing activities:

1. Write on what is interesting about one of the animals in the terrarium.
2. Make up action words about the animals. For example, gerbil words could be hop, bounce, jump, turn, glance, sprint,and leap; some iguana words might be slide, slither and stare.
3. Write couplets or short poems about the animals.
4. Keep individual gerbil logs for recording such things as its tricks, food preferences, and new toys.
5. Keep a class observation chart on which each child can record his observations.
6. Make reports on books about the desert.

IV. HOW PARENTS CAN HELP WITH THE DESERT LIFE UNIT

There is a great deal that parents can do with their children to supplement the school work on deserts. On the following pages is a Guide for Parents written by Mrs. Coco, whose son_ studied Desert Life this year. There are thirty of these reports supplied so you can send them home with your pupils if you want.

A GUIDE FOR PARENTS TO FIND RESOURCE MATERIALS FOR THE DESERT LIFE UNIT

A. INTRODUCTION

When your child starts the Desert Unit, he will have many questions about an area that is as unfamiliar to him as a foreign country. The animals, plants, birds, etc. are not native to this state so you will have to take him to view these things.

There are many opportunities that are educational and enjoyable to both child and parent. This guide was compiled to help the parent quickly learn of the regional resources.

For those of you who are unable to take these short trips, encourage the child to do home projects. The class will study tracks. Go out in your yard and have the child draw the tracks he can find. You can also make plaster molds of tracks and footprints.

Greene's Stationery Store sells "doodle pads" for $1.25. These are large sheets of paper excellent for drawing. Have your child draw animals and plants that interest him. If he can't draw in detail, have him copy pictures from books.

Making animals from clay is a good way to learn how the animal or bird walks or flies. Carving Ivory soap will make a good owl and help the student understand the construction of the claws and wings.

A report on the desert is fun and can be done over a long period of time. It can be mostly drawings or pictures cut from magazines. Second graders don't like to write long papers, but he should be taught to title and name his pictures.

It is important for the parent to take the time and show interest in helping his child learn more about the unit.

B. WRITTEN INFORMATION

1. Wellesley Public Library

The children's section has many books on the desert. They are not all in one section, and at times some books have only a small section on a certain animal or plant. Ask the ladies in this section; they are very helpful. Teach your child to use the index card file to find his own book.

2. Books

Life Magazine has one titled Deserts. Its cost is $3.98 and it is an excellent book.

The How and Why Wonder Book has one titled Deserts which costs $1.00 and can be found in most dime stores.

The How and Why Wonder Book also has a book entitled Reptiles and Amphibians at a cost of $.59. It is good to buy these books at the start of the year so the child can use them all year.

3. National Geographic

If you don't take this magazine, go to church rummage sales. They often have back issues.

4. Newspapers

The Sunday travel sections usually have articles or pictures of the Southwest. The entertainment section always carries a list of special showings in and around Boston. For example, in the winter of 1967 the Boston Public Library had a display of carved owls.

C. MATERIAL FROM DESERT AREAS

Friends traveling in the Southwest can send you picture post cards of plants and animals native to the desert. Many stores in airports sell colored slides of their cities and surrounding areas. The Dallas, Texas airport sells nine cactus plants in a box for about $2.00.

1. Plants

Carters Cactus Farm in Tewksbury, Mass. is about 40 miles from Wellesley. The child can go through the greenhouse filled with every type cactus. They have a plant display in the front room with some very large and unusual varieties of desert cactus. You can buy cacti in a price range from $.15 to $15.00.

I wrote the farm asking if they were willing and able to have class field trips, but received no reply. Therefore, I think it is best to visit as individual families. It is well worth the trip.

The dime stores have a few cactus and air plants.

Barr's in South Natick has some varieties of cactus.

2. Animals

Live toads, lizards, snakes, and gerbils can be seen in pet stores. Pet World, Needham Pet Store, and the Pet Store in Waltham has some of these animals. The store in Waltham is the best, and if you tell the owner your child is studying desert animals, they will show him the animals and explain how they eat, drink, etc.

Lizards can also be ordered directly from the same supplier that sells to the schools:

The Pet Corral
4146 Oracle Road
Tuscon, Arizona

Desert Iquana and chuckwallas are $2.00 each, and can only be purchased from about April 5th through September 30th.

Gerbils are nice to buy for your own home study project. If you don't want "many" gerbils, two males cost about $2.00 each, a terrarium about $6.00, and then you need food, wood chips, water bottle, dirt - the entire package should be about $10.00. This would be a marvelous birthday gift, and your child will learn first-hand the habits of these little animals. The cheapest place to get gerbils is from the breeder:

Tumblebrook Farm
Brant Lake
New York

3. Museums

Blue Hills Trailside Museum has outdoor exhibits of hawks, foxes, and amphibians. If you call the Trailside Museum early in September and tell them what the class is studying, they are very willing to make up a special field trip to include the animals native to the desert. They have prairie warblers, wood ducks, broad-winged hawk and scarlet tanager birds. They have thirty different species of mammals, among them the white tailed deer, the brown bat and squirrel. In the amphibian field they have bull frogs, American toads, ring-necked snakes and spotted salamanders. The telephone number is 333-0690.

Children's Museum has live animals that may be handled.

The Museum of Science on the first floor has a live animal area with owls, porcupines, and snakes. Also on the first floor in the stage area there are brief demonstrations featuring a great horned owl, an indigo snake, a porcupine and a hedgehog.

Harvard University Museum is the best place to view all the animals. In the Museum of Comparative Zoology the child can see all the North American birds, North American rattlesnakes, mammals of the world, reptiles and amphibians. All school children should go to this museum -- studying the desert or not!

4. How to Find Places

The book In And Out Of Boston With Children is an excellent book for every parent. It costs $2.45 at any book store and tells you all about the places to go and how to get there by public transportation, prices, times they open, etc. The Yellow Pages lists pet stores, museums, flower stores, and book stores.

In closing let me say -- do make the time and effort to do at least one outside project or trip with your child. You will enjoy it as much as he does.

Hannalou J. Coco

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